

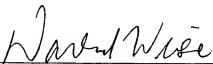
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February 8, 2008

I, David Wise, having been duly sworn, depose and say that the accompanying patent CN 86 2 09937 U entitled "Micro air compressor" has been translated into English by Burg Translations, Inc., and that, according to the best of my knowledge and belief, it is a true and accurate rendering of the original Chinese document.



David Wise, Project Manager

Subscribed and sworn before me on
February 8, 2008



John R. Emerzian, Notary Public

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CN 86 2 09937 U

(12) New Utility Model Patent Application and Specifications

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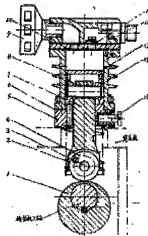
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(74) Patent agency
Shandong Province Patent
Services Office
Agent Li Guibin

(54) Name of new utility model Micro air compressor

(57) Abstract

The present new utility model supplies a micro air compressor, used to create an air supply source for a small four-wheel tractor's air brake device. The present new utility model is installed on the front end cover of the small four-wheel tractor, the tractor 1 axle has installed a single circle-arc cam, and it makes use of the single circle-arc cam to propel the movement of the roller and the plunger rod, to effect the plunger's reciprocal operation, the plunger rod has a positioning steering device and there are established oil grooves to ensure lubrication of the plunger. Additionally, there is a release device.



Registration certificate number 1407 publication of the City of Beijing

[text in figure:]

— Front cover plate

Tractor 1 axle —

872U08117/29-318

Patent Claims

1. A micro air compressor used to create an air supply source in a small four-wheel tractor air brake device comprising a plunger, a cylinder case and a cylinder head assembly; it is characterized in that there is established a micro air compressor with a single circle-arc cam (1) capable of being installed on a small four-wheel tractor 1 axle and able to propel the micro air processor's roller (4) and plunger rod (7) in reciprocal movement, between the plunger rod (7) and the connecting plate (5) there is installed a cylindrical screw spring (2), causing the roller (4) to be in full mutual contact with the single circle-arc cam (1), at the lower end of the plunger rod (7) there is established a roller (4), using the lock (3) to connect in one piece with the plunger rod (7), the connecting plate (5) and the cylinder case (14) are linked, the upper end of the plunger rod (7) connects to the plunger (13), on the upper part of the cylinder case (14) there is established a cylinder head assembly (12).
2. A micro air compressor according to Patent Claim 1, characterized in that on the plunger rod (7) and the connecting plate (5), there is established a steering and positioning key (17).
3. A micro air compressor according to Patent Claim 1, characterized in that the roller (4) uses a 300 model axle bearing.
4. A micro air compressor according to Patent Claim 1, characterized in that there are multiple oil grooves open on the connecting plate (5).

Specifications

Micro air compressor

The present new utility model supplies a micro air compressor used as an air supply source in a small four-wheel tractor air brake device.

Existing reciprocal-style micro air compressors generally use a crankshaft and connecting rod structure and employ incoming dynamic force to make the crankshaft rotate; the connecting rod creates an up-and-down swinging motion, thereby effecting the plunger's reciprocal operation, to achieve the objective of intake and compression of air. This type of structure requires a crankshaft, a connecting rod, and a large crankshaft case manufactured using complex technology. The zy-0.03/0.69 model air compressor is this type of structure. This model of air compressor generally is installed on the right rear side of a small four-wheel tractor. At the tractor 1 axle's projecting end is installed a belt wheel, and a triangular rubber belt used to make the air compressor rotate. This mode of motion transfer requires manufacture with a belt wheel, and the triangular rubber belt must be replaced often.

In order to surmount the above-described defects, the objective of the present new utility model is to supply a reciprocal-style micro air compressor with a tightly arranged, simple, inexpensively and easily produced structure.

The present new utility model uses a hydraulic pump installed at the front end cover of a small four-wheel tractor, using the structural principle of a roller single circle-arc from a moving rod, on the small four-wheel tractor 1 axle there is installed a single circle-arc cam (1), to propel the roller (4) and plunger (7) to produce up and down reciprocal movement; the plunger rod (7) drives the plunger (13) to move in a reciprocal fashion.

In order to make the roller (4) and the single circle-arc cam (1) mesh normally and stop the appearance of rotation in the reciprocal operation of the plunger (13) rotation, there is established a steering positioning key (17) on the plunger rod (7) and the connecting plate (5).

In the roller (4), plunger rod (7) and single circle-arc cam (1) body, the plunger rod (7)'s displacement equation is a triangular function relationship. Throughout the entire process, when acceleration is greater there is something of a warning impact, but changes in acceleration as a rule tend to slide and at the midpoint of the process there is almost no impact. In order to prevent the occurrence of impact on the overall structure, it is necessary to install a matching and rational cylindrical screw spring (2) between the plunger rod (7) and the connecting plate (5), making the roller (4) and the single circle-arc cam (1) come fully into contact with each other.

The present new utility model has established on the cylinder case (14) a release device (15) in mutual contact with the plunger rod (7), in order to effect plunger rod (7) detachment from the single circle-arc cam (1) and cause the tractor 1 axle to spin.

In order to improve the life span of the present new utility model, the roller (4) uses a 300 model axle bearing with greater axle bearing force and load impact strength. In order to ensure that the plunger (13) has sufficient lubrication, multiple oil grooves are open on the connecting plate (5).

In a comparison of the present new utility model with existing reciprocal-style micro air compressors, the crankshaft connecting rod and the crankshaft case on the structure have been discarded and the belt wheel has been removed from the motion transfer portion. The structure's tight arrangement, simplicity, small size, light weight and innovative applications make it possible to reduce its cost by 40% and satisfy the performance requirements of the small four-wheel tractor air brake, making the air brake system simpler and more attractive. It is suitable for use in producing various models of small four-wheel tractors for transportation work.

Following are attached figures and embodiment to serve as detailed description of the present new utility model.

Description of the attached figures:

Figure 1 is the front view of the present new utility model;

Figure 2 is the left elevation of the present new utility model.

Below is a specific embodiment for the present new utility model.

According to Figure 1 and Figure 2, the present new utility model is composed of a single circle-arc cam (1), a roller (4),

a lock (3), a plunger rod (7), a brass cover (8), a plunger (13), a release device (15), a cylinder case (14), a connecting plate (5), a gasket (6), a cylinder head assembly (12), a steering and positioning key (17), and other parts.

The present new utility model is installed by means of a connecting plate (5) at the hydraulic pump location on the front end cover of a small four-wheel tractor. The single circle-arc cam (1) is installed on the small four-wheel tractor 1 axle and secured using a key (16). The single circle-arc cam (1) rotates with the tractor 1 axle, impelling the roller (4), plunger rod (7), and plunger (13) to move up. When the single circle-arc cam (1) moves from the minimum point upward and the plunger (13) moves from the lower dead point upward, air in the cylinder case (14) is compressed and when the pressure increases, the inflow reed valve (10) closes. When internal pressure in the cylinder case (14) is greater than the external pressure of the discharge reed valve (11), the discharge reed valve (11) is opened at the top, constricting the air by means of a channel inflow air reservoir (not indicated in the figure). When the single circle-arc cam (1) moves to the maximum point, the plunger (13) reaches the upper dead point, the discharge process concludes and when the single circle-arc cam (1) continues to move from the maximum point to the minimum point, it uses the tension of the compressed spring (2) and the plunger (13) moves downward; when the internal pressure of the cylinder case (14) is less than the air pressure, the inflow reed valve (10) is initiated, and air goes through a filter (9) and enters the cylinder case (14). When the single circle-arc cam (1) rotates to the minimum point, the plunger (13) also reaches the lower dead point and the air inflow process concludes. In this fashion the single circle-arc cam (1) continually rotates and the plunger (13) is also in continual reciprocal movement, thus effecting the work of the present new utility model.

Attached figures to specifications

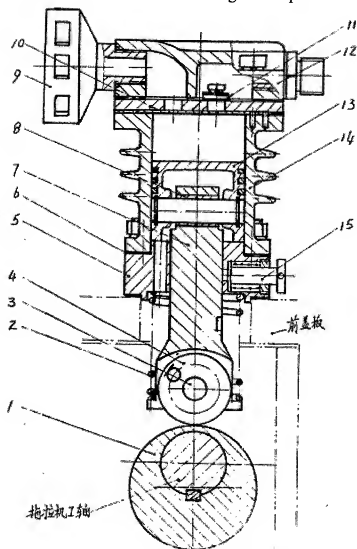


Figure 1

[text inside figure:]

- Front cover plate

Tractor 1 axle -

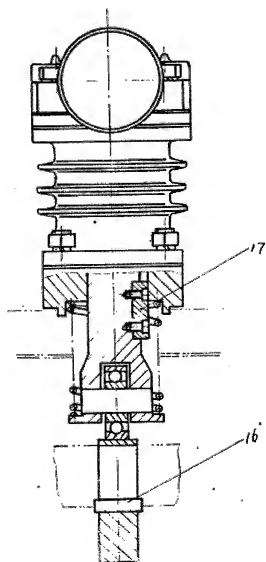


Figure 2

MICRO AIR COMPRESSOR

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Application number: CN19862009937U 19861128
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→ Utility Made Patent Specification
(12) 实用新型专利申请说明书

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Title

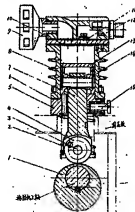
Abstract

← (54) 实用新型名称 微型空气压缩机

← (57) 摘要

Micro-type Air compressor

本实用新型提供一种微型空气压缩机,用作小四轮拖拉机气制动装置中供气源。本实用新型安装在小四轮拖拉机前盖上,拖拉机轴上装有单圆弧凸轮,利用单圆弧凸轮推动滚子和柱塞杆移动,实现活塞的往复运动,柱塞杆有定位导向装置,设有油道保证活塞润滑,并设有卸荷装置。



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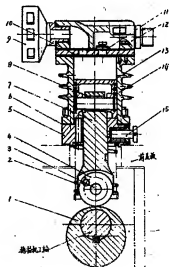
(74) 专利代理机构 山东省专利服务处

代理人 李贵斌

(54) 实用新型名称 微型空气压缩机

(57) 摘要

本实用新型提供一种微型空气压缩机,用作小四轮拖拉机气制动装置中供气源。本实用新型安装在小四轮拖拉机前盖上,拖拉机1轴上装有单圆弧凸轮,利用单圆弧凸轮推动滚子和柱塞杆移动,实现活塞的往复运动,柱塞杆有定位导向装置,设有油道保证活塞润滑,并设有卸荷装置。



1. 一种包含有活塞、缸筒及缸盖组件的小四轮拖拉机气制动装置中用作供气源的微型空气压缩机，其特征在于它设有一能安装在小四轮拖拉机 I 轴上的可推动微型空气压缩机的滚子〔4〕、柱塞杆〔7〕往复运动的单圆弧凸轮〔1〕，在柱塞杆〔7〕与联结盘〔5〕之间装有圆柱螺旋弹簧〔2〕，使滚子〔4〕与单圆弧凸轮〔1〕始终相接触，柱塞杆〔7〕的下端设有滚子〔4〕，用销子〔3〕与柱塞杆〔7〕联为一体，联结盘〔5〕与缸筒〔14〕联接，柱塞杆〔7〕的上端联接活塞〔13〕，在缸筒〔14〕的上部设有缸盖组件〔12〕。

2. 按照权利要求 1 所述的微型空气压缩机，其特征在于，在柱塞杆〔7〕、联结盘〔5〕上，设有导向定位键〔17〕。

3. 按照权利要求 1 所述的微型空气压缩机，其特征在于滚子〔4〕采用 300 型轴承。

4. 按照权利要求 1 所述的微型空气压缩机，其特征在于在联结盘〔5〕上开有多个油孔。

微型空气压缩机

本实用新型提供一种微型空气压缩机，用于小四轮拖拉机气制动装置中供气源。

现有微型往复式空气压缩机，一般采用曲轴和连杆结构，动力输入使曲轴转动，连杆作上下摆动，从而实现活塞的往复运动，达到吸入和压缩空气的目的。这种结构必需有制造工艺复杂的曲轴、连杆和一个大的曲轴箱。ZY-0.03/0.69型空气压缩机就是这种结构。这种型号的空气压缩机一般装在小四轮拖拉机的右后方，拖拉机1轴伸出端装一皮带轮，通过三角胶带使空气压缩机转动，这种传动方式必须制造皮带轮，而且需要经常更换三角胶带。

为了克服上述缺点，本实用新型的目的是提供一种结构紧凑、简单，造价低廉，制造容易的微型往复式空气压缩机。

本实用新型采用装在小四轮拖拉机前盖安装液压泵的位置，利用滚子从动杆单圆弧机构原理，在小四轮拖拉机1轴上装一单圆弧凸轮(1)，推动滚子(4)，柱塞杆(7)作上下往复运动，柱塞杆(7)带动活塞(13)往复运动。

为了使滚子(4)与单圆弧凸轮(1)的正啮合，防止活塞(13)往复运动中出现转动，在柱塞杆(7)和联结盘(5)上设有导向定位键(17)。

在滚子(4)、柱塞杆(7)、单圆弧凸轮(1)的机构中,柱塞杆(7)的位移方程式是三角函数关系。在整个行程中,加速度较大,有较缓和的冲击,但加速度变化规律较平滑,且行程中点无冲击,为了防止整个机构出现冲击,必须在柱塞杆(7)与联结盘(5)之间装有匹配合理的圆柱螺旋弹簧(2),使滚子(4)与单圆弧凸轮(1)始终相接触。

本实用新型在缸筒(14)上设有与柱塞杆(7)相接触的卸荷装置(15),以实现柱塞杆(7)与单圆弧凸轮(1)脱离,使拖拉机1轴空转。

为提高本实用新型的寿命,滚子(4)采用承载力 and 承受冲击力较大的300型轴承,为保证活塞(13)有足够的润滑,在联结盘(5)上开有多个油孔。

本实用新型与现有微型往复式空气压缩机相比,结构上去掉了曲轴连杆、曲轴箱,传动部分去掉了皮带轮,结构紧凑,简单,体积小,重量轻,新颖实用,造价可降低40%,并能满足小四轮拖拉机气制动性能要求,使气刹车系统更简单、美观。适用于搞运输作业的各种型式小四轮拖拉机。

以下结合附图和实施例对本实用新型作详细地叙述。

附图说明:

图1为本实用新型主视图;

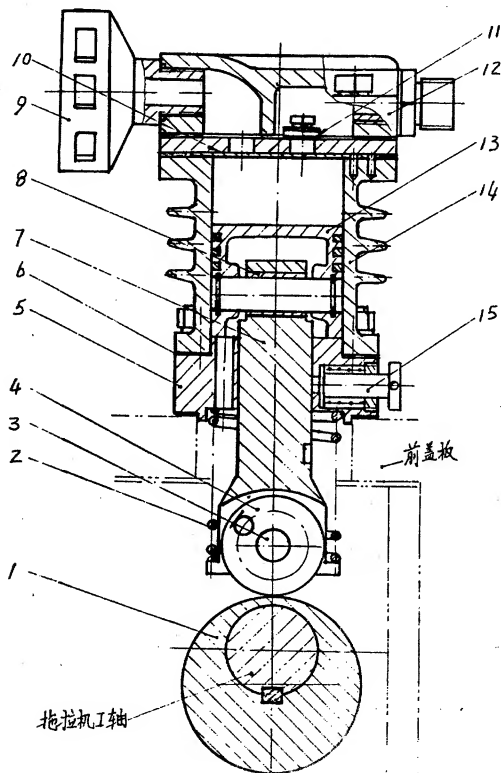
图2为本实用新型左视图。

下面是本实用新型的一个具体实施例。

如图1、图2本实用新型由单圆弧凸轮(1),滚

子(4)、销子(3)、柱塞杆(7)、铜套(8)、活塞(13)、卸荷装置(15)、缸筒(14)、联结盘(5)、垫片(6)、缸盖组件(12)、导向定位键(17)等部件组成。

本实用新型通过联结盘(5)安装在小四轮拖拉机前盖液压泵处。单圆弧凸轮(1)安装在小四轮拖拉机的I轴上,用键(16)固定。单圆弧凸轮(1)随拖拉机I轴转动,推动滚子(4)、柱塞杆(7)、活塞(13)上升,当单圆弧凸轮(1)由最低点向上运动时,活塞(13)由下死点向上移动,缸筒(14)内空气被压缩,压力增大时,进气舌簧阀(10)关闭。当缸筒(14)内压力大于排气舌簧阀(11)外面的压力时,排气舌簧阀(11)被顶开,压缩空气通过管道进入储气筒(图中未标),当单圆弧凸轮(1)移动到最高点时,活塞(13)达到上死点,排气过程结束,单圆弧凸轮(1)继续由最高点向最低点运动时,利用被压缩的弹簧(2)的弹力,活塞(13)向下移动,当缸筒(14)内压力小于空气压力时,进气舌簧阀(10)开启,空气经滤清器(9)进入缸筒(14)内,当单圆弧凸轮(1)转到最低点时,活塞(13)亦到达下死点,进气过程结束,如此单圆弧凸轮(1)不断转动,活塞(13)也不断往复运动,实现本实用新型的工作。



图

